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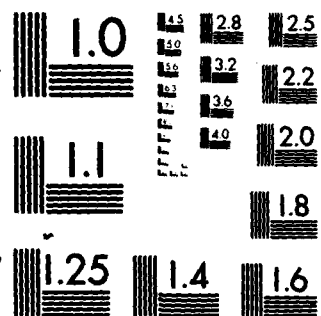
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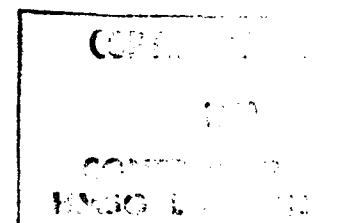
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**SWEDISH DEFENCE RESEARCH  
ABSTRACTS 1979/80-2**  
(FRÖ FÖRSVARS FORSKNINGS REFERAT 1979/80-2)

by

National Defence Research Institute, Stockholm

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Procurement Executive, Ministry of Defence  
Farnborough, Hants

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6 SWEDISH DEFENCE RESEARCH ABSTRACTS 1979/80-2  
(FRO FORSVARS FORSKNINGS REFERAT 1979/80-2)

21 Trans. from  
National Defence Research Institute Stockholm (Sweden)

Translator  
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11 Jul 80

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EDITOR'S SUMMARY

The Swedish National Defence Research Institute issues a quarterly list of unclassified Reports published by the Institute. The titles of these Reports and informative abstracts have been translated in English. This volume is the second issue of 1979/80. Further volumes will be translated in due course. The main topics covered are: Protection - atomic, biological, chemical; ammunition and weapons; conduct of war, information and commands; vehicles and spacecraft; reliability and logistics; human factors; associated studies and their solutions; positive methods for limitation and control of armaments; psychology reports.

EDITOR'S NOTE

The Reports are in Swedish unless some other language is indicated (usually English). When requesting Reports it should be appreciated that an English version will not normally be available, and that the prices of the original Swedish documents have not been indicated in this Translation. Reports may be obtained from:

FOA Centralkansliet, 104 50 Stockholm, Sweden

310450 72

Index to FRÖ 79/80-2A PROTECTION - ATOMICA3 Effects of nuclear explosions, and protective measures

- (65) Pharmacologic effects of radiation protective compounds related to  
their protective effect in mice (in English)

B PROTECTION - BIOLOGICALB1 Consideration and appraisal of the threat from biological attack.  
Forecasts and summaries

- (66) Long-range air transmission of bacteria (in English)

B2 Protective measures

- (67) Possibilities for disinfecting material in the field  
(68) Luminescence analysis - a summary of the literature

C PROTECTION - CHEMICALC1 Consideration and appraisal of the threat of chemical warfare.  
Forecasts and summaries

- (69) Chemical risks to the public during an emergency and in wartime.  
Documents for and a summary of Study Conferences, Spring 1979  
(70) Simulated accidents in the handling of phosgene at Messrs Kenogard AB  
at Sundsvall

C2 Protective measures

- (71) Surrogate training gases for chemical indication  
(72) Muscle fragments from an adult rat, their preparation, culture and  
characterisation

D AMMUNITION AND WEAPON TECHNOLOGYD1 Technology of explosives

- (73) Stability tests on propellant powder by thin-film chromatography.  
13 Some factors which affect the extraction of diphenyl amine

D4 Technical aspects of warheads

- (74) Sensitivity test of ANFO explosive with added aluminium

D8 System studies

- (75) Design specification for Datalab - system for data analysis based on  
the relational model of data (in English)  
(76) KVALOPS - a model for studies of optimum quality in a weapons system  
(77) Target-location equipment

E CONDUCT OF WAR - INFORMATION AND COMMAND TECHNIQUEE1 Reconnaissance, target plotting and fire control

- (78) Peak detection using difference operators (in English)  
(79) Accelerated projection methods for computing pseudoinverse solutions  
of linear equations (in English)

- (80) Chain-link coding and segmentation for raster scan devices (in English)
- (81) Display unit constructed from optical fibres and light-emitting diodes
- (82) Automatic optical control of the workpiece in a lathe

## E2 Communications

- (83) Importance of the transmission properties of the sea for the design of hydro-acoustic systems. A Underwater communication

## E3 Guidance, navigation and target identification

- (84) Report from a course on 'Satellite system for navigation, traffic control and monitoring'

## E4 Counter-measures, including signal interception and technical intelligence

- (85) A seismic activity detector (in English)

## E5 Technical reliability

- (86) Inductive positional detector in an industrial safety system

## F VEHICULAR AND SPACECRAFT TECHNOLOGY

### F4 Spacecraft

- (87) 175 days in 'Salyut-6' and other current Soviet space activities

## H HUMAN ENVIRONMENT

### H1 Investigations, future projections

- (88) Structure and development of the individual's willingness for self-defence: A pilot study

### H2 Hostile environments, closed units, field hygiene

- (89) Technical safety control of propellants. Database and computer program
- (90) Validation tests for the effects of tone reactions

### H3 Environmental extremes

- (91) Combined effects of ethanol and hyperbaric air on body sway and heart rate in man (in English)
- (92) Roles of nitrogen, oxygen and carbon dioxide in compressed-air narcosis (in English)
- (93) Visit report - Current research in the physiology of acceleration and compression
- (94) Influence of nitrous oxide, nitrogen, neon and helium on the beating frequency of the mouse sinus node at high pressure
- (95) Adequate oxygen supply in extreme conditions
- (96) Medical catastrophe studies in Östersund. Railway accident at Lugnvik 10 August 1978
- (97) Assessment of protease (elastase) as a Pseudomonas Aeruginosa virulence factor in experimental mouse burn infection

### H6 Environmental extremes

- (98) Inter-individual consistency of catecholamine excretion in relation to circadian rhythms (in English)

- (99) Local lactate and exhaustion (in English)
- (100) 'SPORQ' - Shalit perceptual organisation and reduction questionnaire.  
Report No.3: Validity (in English)
- (101) Longitudinal stability of personal characteristics: ratings
- (102) Longitudinal stability of social relations

#### H7 Testing and job analysis

- (103) Simple apparatus based on a programmable calculator for measuring  
energy expenditure in man (in English)

#### H8 Training procedures

- (104) Mental training. An account of some methods
- (105) Report on an official visit abroad, 14-18 August 1978

#### M INTERDISCIPLINARY STUDIES AND INVESTIGATIONS

##### M3 Predictive planning

- (106) The USA report. A new light on American foreign policy
- (107) Power politics and the oil distribution crisis of the 1980s
- (108) Research and training in policy analysis - impressions of a visit to  
the USA

##### M4 Systems and program planning

- (109) Supremacy at sea

##### M7 Follow-up and monitoring of scientific research outside FOA

- (110) Bibliography on the evaluation of numerical software (in English)

#### N MILITARY ENGINEERING RESEARCH

- (111) Effects of mishaps in underground munition storages (in English)

#### EMERGENCY COUNCIL FOR PSYCHOLOGICAL DEFENCE

- (112) The measurement of opinion
- (113) International broadcasting as an instrument of propaganda
- (114) The wind which passed over
- (115) Youth and security policy
- (116) Opinion 79
- (117) Credibility of news in the press and on TV
- (118) Public opinion and security policy - Experience in West Germany
- (119) The overloaded ether: the battle for the frequencies
- (120) Psychological warfare between China and Taiwan
- (121) The press on the snowstorm



A PROTECTION - ATOMIC

A3 Effects of nuclear explosions, and protective measures

(65) FOA report B 40106-A3

Pharmacologic effects of radiation protective compounds related to their protective effect in mice (in English)

Carl-Olof Criborn and Curt Rönnbäck

January 1980

The report concerns investigations of certain radiation protective compounds, principally cysteamines, their effects on respiration, rectal temperature and oxygen consumption.

The radiation protective effect of the compounds under test appears to have some connection with the modifications to the above parameters caused by these compounds.

The effects of some control compounds demonstrated that, even though they may simulate the effects caused by cysteamine on certain metabolic processes, the same degree of protection as that of cysteamine is not obtained (expressed as DRF for LD 50).

The experiments have also shown that the depressing effect of the radiation protective compounds under test on the metabolism and also the disturbances to the sensory functions, coincident with the effective period of these compounds, can mean that the normal efficiency of a treated individual can be partly or wholly modified, leading to more or less serious incapacitation.

Offprint from Acta Radiologica Oncology (1979), 18, Fasc. 1.

B PROTECTION - BIOLOGICAL

B1 Consideration and appraisal of the threat from biological attack.  
Forecasts and summaries

(66) FOA report B 40101-B1

Long-range air transmission of bacteria

(in English)

Å. Bovallius and others

When recording the numbers of airborne bacteria at two measuring stations in south-east Uppland, exceptionally high contents were obtained on one occasion which could not be attributed to any nearby source. By collating the test data obtained with meteorological information, it was possible to trace the origin of the bacteria so discovered to soil particles from an area north of the Black Sea, carried into the atmosphere by a sandstorm. All the bacteria identified were also typical spore-forming soil bacteria. The results obtained illustrate that under favourable conditions bacteria can be transported for very long distances, in this case about 1800 km.

Offprint from Applied and Environmental Microbiology (1978), 35, June, 6, pp 1231-1232; FOA Reprints 1979/80:11.

B2 Protective measures

- (67) FOA report A 40031-B2  
Possibilities for disinfecting material in the field  
Åke Bovallius and others

February 1980

In the Defence and Civil Defence services, etc, equipment is available in various places and at different levels in these organisations, which in most cases has been produced mainly for other purposes but which could be useful for disinfection in the field. The report contains a list of such equipment together with various chemical disinfectants, and discusses how the various items can be employed for disinfection under field conditions. The report gives examples of some possible means of integrated protection and alternative uses for existing resources. Examples are also provided of personal and physical resources for disinfection in different areas of the overall defence system.

An appendix contains a draft 'Instruction for the biological disinfection of material in an ISB section', which was compiled in conjunction with the Defence Research Institute and the Defence School of Personal Protection. The draft instruction forms part of DSPP document F8 503, 21 January 1975, submitted to the C-in-C Swedish Army.

- (68) FOA report C 40106-B2  
Luminescence analysis - a summary of the literature  
Gunilla Eriksson and others

December 1979

The present report contains a selection of the literature, starting from the luminescence project in progress since 1969 at the FOA and including planned activities up to the financial year 1979/80. The selection consists of original articles and surveys on analytical luminescence with certain studies in the chemistry of luminescence reactions.

C PROTECTION - CHEMICAL

- C1 Consideration and appraisal of the threat of chemical warfare.  
Forecasts and summaries

- (69) FOA report A 40029-C1  
Chemical risks to the public during an emergency and in wartime. Documents for and a summary of Study Conferences, Spring 1979  
Åke Broxvall and others

November 1979

In May 1979 the Civil Defence Authority and the Defence Research Institute held a number of Study Conferences on the subject of Radioactive and Chemical Risks to the Public during an Emergency and in Wartime. These conferences were intended as an evaluation of the results and a report on the state of knowledge gained under the TOX project. This report deals with some questions of the chemical risks. Radioactive risks are considered in a separate report.

1404

The possible injurious effects on persons at various distances away from depots of chlorine, sulphur dioxide, ammonia and hydrochloric acid were calculated for two different types of weapon effects on a depot. The calculations were performed by means of mathematical and toxicological models. Calculations show that considerable effects at a distance can be obtained, and that these are heavily dependent on the size of the depot and the type of damage inflicted on it.

Analysis of the existing models shows that considerable uncertainty exists concerning the intensity at the source, propagation and toxicological effects. Some research effort is therefore required, especially to develop models of heavy gases and for the toxicological effect for rapid variations of concentrations.

The depots which, if damaged by weapons, can inflict serious or lethal injury to individuals 200 metres away have been listed. This catalogue shows that about 500 such depots, which house chlorine, sulphur dioxide and ammonia, are distributed about the entire country.

A study of various protective measures capable of reducing or preventing the effects on individuals shows that the existing filters in shelters and in respirators have only a limited ability to protect against certain chemicals. During occupation of a shelter therefore the ventilation should be reduced as much as possible.

An analysis was conducted during the Study Conferences to determine what Civil Defence measures were required to protect individuals from chemical risks during an emergency and in wartime. Further information needed from the study parties was also discussed.

(70) FOA report A 40030-C1  
Simulated accidents in the handling of phosgene at Messrs Kenogard AB  
at Sundsvall  
Gunnel Dreborg and others December 1979

At the instance of the Hydraulic Engineering Office at Sundsvall the Defence Research Institute (FOA) has made a rough analysis of the possible injurious effects of a leakage of phosgene from Messrs Kenogard AB at Stockvik near Sundsvall. This commission formed part of a current planning exercise of land utilisation for an area adjacent to the factory.

Two simulated accidents were used to calculate the spread and toxic effects to different distances. The occurrence of weather conditions which might produce wider areas at risk was also calculated.

The report is published with support from the Hydraulic Engineer's Office at Sundsvall.

C2 Protective measures

(71) FOA report C 40104-C2

Surrogate training gases for chemical indication

Birgetta Carlsson and Gösta Logård (DSPP)

October 1979

Three surrogates have been produced as training gases for chemical indication in collaboration with the Defence Research Institute and the Defence School of Personal Protection, Experimental Wing. These surrogates are intended for use in chemical indication practice with No.102 indicator paper. They have been tested under various weather conditions, both by the director of the experiment and by troops, and found largely to satisfy the requirements for a gas surrogate.

(72) FOA report C 40105-C6 (H5)

Muscle fragments from an adult rat, their preparation, culture and characterisation

Roland Nordfelth and others

November 1979

Muscle fragments were isolated from adult rat striped muscle tissue. A combination of mechanical and enzyme dissection was used. When the fragments were placed in a tissue culture they took on, during at least 5 weeks, a morphology characteristic of striped muscle 'in vivo'. Cells resembling fibroblasts also developed in these cultures together with cells having large vesicae containing fat. The results are reported, which indicate that these latter cells derive from those resembling fibroblasts. The method described can facilitate studies of contact formation between muscle fragments and neuronal cells in culture.

D AMMUNITION AND WEAPON TECHNOLOGYD1 Technology of explosives

(73) FOA report C 20330-D1

Stability tests on propellant powder by thin-film chromatography.

13 Some factors which affect the extraction of diphenyl amine.

Malle Westin

December 1979

The present report describes the way in which extraction time, temperature, quantity of extracting agent and particle size affect the extraction of diphenyl amine in testing the stability of powder propellant.

D4 Technical aspects of warheads

(74) FOA report C 20328-D4

Sensitivity test of ANFO explosive with added aluminium

Ola Listh and Gösta Gustafsson

December 1979



KVALOPS is programmed for operation in an interactive mode on a DEC-10 with a choice of display of results. Among other things it can be operated through a graphic terminal, one's own and the enemy's losses and the loss ratio being plotted as a function of some desired parameters. The model is chiefly intended for use (in conjunction with costing research) in studies of those parameters in different weapon systems which are most worthwhile developing. The report includes an example of a parametric study of tanks deployed against attacking mechanised formations.

- (77) FOA report C 20331-D8 (E3,E2)  
Target-location equipment  
Sylve Arnzén and others

December 1979

The result of work in 1978/79 is summarised as follows:

The time is not ripe for proposing any procurement now. Both practical and theoretical studies have shown that present-day equipment does not afford the necessary accuracy and reliability. However the development of different types of ground navigation system is underway, mainly for military purposes. FOA experiments with the Decca Hi/Fix/6 system has contributed to this development. The work of the team should therefore continue in order to keep track of, and if possible guide, developments, and should resume intensive studies when suitable projects can be presented.

E CONDUCT OF WAR - INFORMATION AND COMMAND TECHNIQUE

E1 Reconnaissance, target plotting and fire control

- (78) FOA report B 30032-E1  
Peak detection using difference operators (in English)  
Jan-Olof Eklund

Complex waveforms can be thought of as being constructed of peaks and troughs, both of a local and a global type. This article describes a method for discovering these peaks and troughs. Various difference operators of different sizes are applied point-by-point and comparisons are drawn among the values supplied by these operators. The method yields a high degree of parallelism.

Offprint from IEEE Transactions on Pattern Analysis and Machine Intelligence (1979), Vol. PAMI-1 No.3, pp 317-325; FOA reprints 1979/80:8.

- (79) FOA report B 30033-E1  
Accelerated projection methods for computing pseudoinverse solutions of linear equations (in English)  
Å. Björk and T. Elfving

This article discusses the problem of computing the least-square (pseudoinverse) solution of a general over- or under-determined linear system of

equations  $Ax = b$ , where  $A$  is a large and narrow matrix of dimensions  $m \times n$ . The method is based on solving the following two systems:

$$(i) \quad x = A^T y, \quad AA^T y = b \quad (\text{the under-determined case}),$$

$$(ii) \quad A^T Ax = A^T b \quad (\text{the over-determined case}).$$

These methods do not require  $AA^T$  or  $A^T A$  to be explicitly formed, and they are therefore an advantage since these matrices are much less narrow than  $A$ . It is first shown how the well-known SOR method and its symmetrical variant the SSOR method can be effectively implemented for (i) and (ii). A discussion follows of how the rate of convergence in the SSOR method can be accelerated either by Chebychev semi-iteration or the conjugate-gradient (cg) method. In particular it is shown how the SSOR-cg method can be implemented so that it requires only two sweeps, by row and column, per iteration step through matrix  $A$ . In the general singular and inconsistent case neither (i) nor (ii) above yields the required least-square solution. It is shown how this solution can be obtained by combining solutions to (i) and (ii).

Some possible areas of application are stated and a number of numerical results are presented from surface approximation, especially in the reconstruction of images.

Offprint from BIT (1979), 19, 2, 145-163; FOA Reprints 1979/80:9.

- (80) FOA report B 30034-E1  
Chain-link coding and segmentation for raster scan devices (in English)  
R. Cederberg

A new method is presented for the coding and segmentation of binary images. The code is based on the normal chain-link code, though coding is performed in the raster mode, which means that the image does not need to be stored for raster-scan encoding or plotting the decoding matrix. The basic coding efficiency is compared with a normal chain-link code. The coding, segmentation and bookkeeping of relations between marks and spaces are performed simultaneously.

Offprint from Computer Graphics and Image Processing (1979), 10, 3, pp 224-234; FOA Reprints 1979/80:10.

- (81) FOA report C 30172-E1  
Display unit constructed from optical fibres and light-emitting diodes  
H. Nygren  
September 1979

This report describes a display unit made with plastic optical fibres and light-emitting diodes, by which the information from an infra-red recording instrument is displayed and filmed by a camera.

The report gives background information on the production of the display unit together with an account of the construction of the apparatus.

- (82) FOA report C 30175-E1  
Automatic optical control of the workpiece in a lathe  
Roger Cederberg and Sören Svensson October 1979

Section 331 of FOA has been engaged on activity in image-processing concerning analysis of form, contour identification, etc.

In this connection liaison with industry has been made. This has resulted in a pilot project involving some instances of the industrial application of image-processing.

E2 Communications

- (83) FOA report C 30167-E2  
Importance of the transmission properties of the sea for the design of hydro-acoustic systems. A Underwater communication  
Tore Pentelius October 1979

The introduction discusses the importance of the classical theory of wave propagation for the design of hydro-acoustic systems. The time- and frequency-dependent properties of the medium are explained with reference to the theory of point-scatter, including a fundamental model of a communication channel. Diversity representation of the channel is dealt with next. Measuring results of the main properties of what is termed the scatter function are presented, and their importance for diversity is described. It is shown how a communication system can be dimensioned by means of the main properties, with some worked examples based on the measurements. The report ends with a brief account of error probabilities and coding, with civil applications.

E3 Guidance, navigation and target identification

- (84) FOA report C 30174-E3  
Report from a course on 'Satellite system for navigation, traffic control and monitoring'  
Åke Oscarsson October 1979

This report mainly contains a description of GPS, the Global Positioning System, in broad terms without covering too much detailed information. The conclusion mentions some of the advantages to be gained by the introduction of GPS. Some future fields of application are also discussed.

The data sheet of a GPS receiver is given in the Appendix.



E4 Counter-measures, including signal interception and technical intelligence

(85) FOA report C 20327-E4

A seismic activity detector  
Paul Mitlid

(in English)  
November 1979

At the request of Hagfors observatory a seismic activity detector has been designed. It is specially suitable for use with a seismometer amplifier of the gain-range type. The detector permits long time-constants owing to the circuit which generates the reference voltage being designed as a digital potentiometer. The reference voltage is linearly proportional to the background noise. The band filter is designed with plug-in units to facilitate changing the cut-off frequencies.

E5      Technical reliability

(86) FOA report C 30166-E5

Inductive positional detector in an industrial safety system  
Håkan Wernström and Mats Gunnerhed

September 1979

The report is the result of an evaluation of an inductive positional detector in industrial safety systems, provided by the FOA at the instance of the Committee on Industrial Safety (ASS).

This contract forms part of a project of the Committee on Industrial Safety concerning evaluation of ASS instruction No.35 on eccentric-shaft presses with respect to electronic control systems.

## F VEHICULAR AND SPACECRAFT TECHNOLOGY

F4            spacecraft

(87) FOA report C 30176-F4

175 days in 'Salyut-6' and other current Soviet space activities  
Astrid Rundkwist Octo

October 1979

The report is mainly concerned with providing information to some extent on what was achieved by the latest crew of the Soviet space station 'Salyut-6' during their record space flight of 175 days. There is also a discussion of some other current activities in the field of Soviet satellites. The information is mainly derived from the Soviet press.

## H HUMAN ENVIRONMENT

# H1 Investigations, future projections

(88) FOA report C 55037-H1

Structure and development of the individual's willingness for self-defence: A pilot study  
Lennart Sjöberg and Lillemor Adrianson November

November 1979

This report discusses research into willingness for self-defence. It emphasises the need for further information-gathering on the thought-processes which underly attitudes relevant to the field of the will for self-defence. It also describes an empirical pilot study in which both adults and young people were interviewed on their opinions and attitudes to the will for self-defence. The quantitative results agree quite well with previous research, while some suggestions also emerge which may serve as a basis for the planning of research. One background variable of potential interest concerning the will for self-defence is felt to be whether an individual has or has not children of his own. In conclusion research into the will for self-defence is also discussed in connection with questions of research planning.

H2      Hostile environments, closed units, field hygiene

(89) FOA report C 54028-H2, H5, H6  
Technical safety control of propellants. Database and computer program  
K-H. Eriksson and O. Hertzberg  
December 1979

Continual testing and chemical analysis - technical safety control - are performed on propellants stored in military depots.

A database termed *MKRUT* has been devised to facilitate the monitoring of the stability of propellants and to obtain a body of collected information on factors affecting this. Computer programs have also been developed for the input of data into the database and for certain statistical processing of the stored data.

An account is also given of the background to the origins of the databases and programs. The structure of the database, functioning of the program and the statistical processing which can be performed are also described. The final part of the report is a detailed user's guide to the management of the database and program.

The HP 3000 computer of Section FMV-M is used to store and process the data. The database is handled by means of the *IMAGE* database system. The input and processing programs are written in Fortran IV.

(90) FOA report C 54029-H2, H3, H6  
Validation tests for the effects of tone reactions  
C-O, Criborn  
December 1979

In order to examine whether a previously reported method for recording respiration and a sensory reaction, the tone reaction, can be applied to indicate the effects of various agents, a comparison of various tests has been made. It was found that different periods can be identified both during and after exposure, in which the effects on the nervous system by means of sensory

reactions do not need to be linked with the volume of respiration per minute and rectal temperature. It was also found that the initial period (0-6 minutes) after treatment can be developed in different ways, so that the effect can be related to certain groups of agents.

H3 Environmental extremes

- (91) FOA report B 58004-H3  
Combined effects of ethanol and hyperbaric air on body sway and heart rate in man (in English)  
A.W. Jones and others

The combined effects of ethyl alcohol (0.72 g/kg body weight) and hyperbaric air (4 and 6 ata) on heart rate and body sway were studied in an amateur diver. Body sway with open and closed eyes was recorded in the lateral and sagittal directions by a statometer. In the alcoholic state body sway initially increased, corresponding to the acute phase of alcoholic poisoning. For a blood-alcohol concentration of a mean value of 0.77 mg/ml, the increase in body sway was statistically significant ( $p < 0.01$ ) compared with the alcohol-free state. 90 minutes after starting the intake of alcohol there ceased to be any significant difference between statograms during the alcoholic and non-alcoholic states at 1 ata. When pressure was increased to 4 and 6 ata body sway increased during both the alcoholic and non-alcoholic states, although the increase was considerably more pronounced in the alcoholic state. It was possible to establish a significant interaction between ambient pressure and alcohol, which indicates that alcohol has a reinforcing effect on the increase in body sway caused by severe exposure to high atmospheric pressure. It was not possible to record any significant difference in heart rate either with or without alcohol, although an increase of ambient pressure produced a reduction in heart rate during both states.

Offprint from Undersea Biomedical Research (1979), 6, 1, pp 15-25;  
FOA Reprints 1979/80:5.

- (92) FOA report B 58005-H3  
Roles of nitrogen, oxygen and carbon dioxide in compressed-air narcosis (in English)  
C.M. Hesser and others

In an experiment to determine the roles of nitrogen, oxygen and carbon dioxide in compressed-air narcosis (depth intoxication), the effects on performance (mental arithmetic and hand motions) of the addition of different concentrations of CO<sub>2</sub> to the breathing supply were studied in a fresh male subject under three different conditions. These were: (i) air breathing at 1.3 ata, (ii) oxygen breathing at 1.7 ata, and (iii) air breathing at 8.0 ata (at the same

oxygen pressure as for (ii)). By relating performance to variations in alveolar gas pressure and comparing data from the three experimental conditions, we arrived at the following results and conclusions. An increase in the pressure of  $O_2$  to 1.65 ata, or of  $N_2$  to 6.3 ata for a constant high level of  $P_{O_2}$  caused a significant 10% reduction in the cognitive (arithmetic) function, but no significant change to the psychomotor (manual motor) function. An increase of alveolar  $P_{CO_2}$  by 10 mm Hg produced about 10% impairment of both the cognitive and psychomotor functions. The results demonstrate that all three gases at increased partial pressures possess narcotic properties, and that the mechanism of  $CO_2$  narcosis differs fundamentally from that of  $N_2$  and  $O_2$  narcosis.

Offprint from Undersea Biomedical Research (1978), 5, 4, pp 391-400;  
FOA Reprints 1979/80:6.

- (93) FOA report C 58006-H3  
Visit report - Current research in the physiology of acceleration and compression  
Ulf Balldin

A report of a visit to the US Air Force School of Aerospace Medicine and the Annual Scientific Meeting of the Aerospace Medical Association, in May 1979.

- (94) No FOA reference  
Influence of nitrous oxide, nitrogen, neon and helium on the beating frequency of the mouse sinus mode at high pressure (in English)  
H. CH. Örnhammar March 1979  
Reprint from Undersea Biomedical Research, Vol 6, No.
- (95) No FOA reference  
Adequate oxygen supply in extreme conditions  
Annual report for 1979 by Head of Section V, Charles Strömblad.  
Royal Military Science Academy Proceedings and Journal 1979, part 6.
- (96) No FOA reference  
Report XL1 1979  
Medical catastrophe studies in Östersund. Railway accident at Lugnvik 10 August 1978  
Börje Rehnström and Henry Lorin  
Medical Catastrophe Committee (KAMEDO)
- (97) No FOA reference  
Assessment of protease (elastase) as a Pseudomonas Aeruginosa virulence factor in experimental mouse burn infection (in English)  
O.R. Pavlovskis and Bengt Wretling  
Infection and Immunity, April 1979, pp 181-187.

H6 Individual and group efficiency

- (98) FOA report B 52003-H6  
 Inter-individual consistency of catecholamine excretion in relation to circadian rhythms (in English)  
 Torbjörn Åkerstedt and Jan E. Fröberg

In three studies 93 subjects were subjected to 75 hours' activity without sleep and without knowing the time of day. The purpose was to study the effect of circadian rhythms in the absence of normal sleep and waking patterns. The excretion of catecholamine ( and other variables) were measured at 3-hourly intervals. The result showed a clear circadian rhythm (with a peak during the afternoon) for adrenalin, though not for noradrenalin. The inter-individual agreement in the excretion of adrenalin was very close for the 24-hour mean, somewhat less for amplitude and very poor for phase. Agreement was also good for the 24-hour mean value for noradrenalin, but poor for amplitude and phase estimates. For both catecholamines their mutual agreement between 3-hour periods was close, being only marginally affected by the time-difference between measurements.

Offprint from Journal of Psychosomatic Research (1978), 22, pp 433-438;  
 FOA Reprints 1979/80:3.

- (99) FOA report B 57012-H6  
 Local lactate and exhaustion (in English)  
 Per Tesch

A number of investigations have shown that hard, fatiguing muscular effort results in maximum concentrations of lactic acid in muscle for exertion times corresponding to 0.5-15 minutes. However results from both animal and human studies indicate that lactic acid is not always homogeneously distributed in muscle. This may possibly have physiological consequences, *eg* for physical efficiency.

Lactic acid was analysed in fibre fragments of fast (FT) and slow (ST) muscle fibres. Biopsies to determine lactic acid were taken from m vastus lateralis after 1 or 2 minutes of maximum bicycling effort, which corresponds to an energy demand of 12% of maximum oxygen intake  $\dot{V}O_2$  maximum. The inability to maintain a given pedalling rate (70 pedal strokes  $\times$  min<sup>-1</sup>) was taken as a sign of fatigue, and the work was discontinued.

Seven young men (x: 22 years, 180 cm, 69 kg), characterised by a high  $\dot{V}O_2$  (x: 66 ml  $\times$  kg<sup>-1</sup>) took part as test subjects. A relation was found to exist between an individual  $\dot{V}O_2$  maximum and the composition of muscular fibre (p<0.05). Concentrations of lactic acid in freeze-dried fragments of muscle

fibres were 25.8 (14.4-35.0) and 18.7 (13.6-26.5)  $\text{mmol} \times \text{kg}^{-1}$  of wet muscle in respectively FT and ST fibres. This significant difference in lactic acid concentration between different types of fibre was also related to activity of the enzyme LDH.

Lactic acid concentration in muscle was related to individual composition of the muscle fibre ( $p < 0.05$ ) but also to exertion time ( $p < 0.05$ ).

The results indicate a higher anaerobic capacity for exertion in individuals having a high percentage of fast muscle fibre together with a higher formation of lactic acid, compared with those having muscle composed of a relatively large proportion of slow fibres. This is in agreement with the metabolic properties of the different types of fibre.

Offprint from Acta physiol. scand. (1978), 104, pp 373-374;  
FOA Reprints 1979/80:4.

- (100) FOA report C 55036-H6  
'SPORQ' - Shalit perceptual organisation and reduction questionnaire.  
Report No.3: Validity (in English)  
Ben Shalit November 1979

This is the third and final report on the SPORQ test - the 'wheel'.

The validity of the test result as regards structure (quantity) and content (quality) was investigated against matching criteria in 6 groups:

- (i) Persons subjected to stress (the Stroop test) where performance was found to be related to the emotional index (E).
- (ii) Crane drivers at a steelworks whose time off sick was related both to the reduction (R) and intensity (I) indices.
- (iii) National Service officers under training whose final markings were related to the R index and their sick leave to the R and I indices.
- (iv) National servicemen assessed by the officers under training, and whose ranking was related to the R index.
- (v) Women after mastectomy as a result of cancer, whose self-esteem and contentment with life was related to the I index.
- (vi) Comparison between UN troops with experience of battle in the Lebanon and other UN troops showed the development of a new perceptual map in line with the expected change.

The results are discussed and a 'mapping sentence' is proposed, which is able to describe how one's own assessment of a situation affects one's adaptation to the situation. The conclusion is drawn that this instrument can be used for predicting the effectiveness with which individuals or groups deal with given situations, and for diagnosing the causes of problems in adapting to these situations.

- (101) No FOA reference  
 Longitudinal stability of personality characteristics: ratings  
 Gunnar Bakteman and David Magnusson (in English)

Reports from Department of Psychology, University of Stockholm, No.537,  
 December 1978.

- (102) No FOA reference  
 Longitudinal stability of social relations (in English)  
 Gunnar Bakteman

Reports from the Department of Psychology, University of Stockholm,  
 No.538, December 1978.

H7 Testing and job analysis

- (103) FOA report B 54012-H7  
 Simple apparatus based on a programmable calculator for measuring  
 energy expenditure in man (in English)  
 Ulf Danielsson

In order to investigate in a rapid, precise and simple manner the energy consumption in man for different types of work, an energy conversion apparatus has been designed, based on a programmable calculator. Using the value of the inhaled airstream, as measured by a fluidistor flowmeter, and the oxygen concentration in the exhaled air, where the oxygen cell is continuously calibrated against the ambient fresh air, the current energy consumption is computed and displayed every minute on the calculator display. Compared with the Douglas bag method performed on an ergometer cycle, the difference between these methods is less than  $\pm 5\%$  when the load varies from 0 to 200 w.

Offprint from Med & Biol. Eng. & Comput. (1979), 17, pp 404-406;

FOA Reprints 1979/80:2.

H8 Training procedures

- (104) FOA report C 55034-H8  
 Mental training. An account of some methods  
 Gerry Larsson and others

October 1979

The object of this report is to present in a popular scientific style a number of methods of mental training. The report deals with the object, execution and the expected results of these training methods, with emphasis on their common characteristics. A collective term for this common core is 'the relaxation response', and its meaning is discussed. In conclusion the following mental training methods are broadly described: autogenous training, muscular relaxation training, self-hypnosis, transcendental meditation and Zen meditation. Each description contains a general section on the origin of the method, its

structure, advantages and disadvantages, with literature references. The account is accompanied by photographs.

- (105) FOA report C 55035-H8  
 Report on an official visit abroad, 14-18 August 1978  
 Gunilla Lorentzon November 1979  
 Object of the visit: to study research and development in the field of leadership at American universities.

M INTERDISCIPLINARY STUDIES AND INVESTIGATIONS

M3 Predictive planning

- (106) FOA report C 10146-M3  
 The USA report. A new light on American foreign policy  
 Gunnar Jervas October 1979

Against the background of a historical analysis this study attempts to disclose the basic structure of present-day American foreign policy and to discuss its possible future development. The historical section covers both a macro-historical breakdown into three main periods, designated for convenience 'isolationism', 'ambivalence' and 'involvement', and a division of the last period into a 'Euro-political', a 'global military' and a 'global diplomatic' phase.

The American failure in Vietnam and elsewhere demonstrated that the USA was no longer capable of exercising the same direct global influence as before in an increasingly changeable world. When faced with the main alternatives of either lowering the sights of their ambitions or of increasing their basis of resources by the formation of an informal coalition, they appear to have preferred the latter way out. By seeking closer collaboration with Western Europe and Japan (trilateralism) and with a number of other rising states (regional great powers), it is hoped to create conditions for an activist policy in the future on a global level. As regards the overall strategy, they appear to be seeking to upgrade the economic and technological capabilities at the expense of the military. On an ideological level they appear to be using the question of 'human rights' as a spearhead, which otherwise is well in line with the traditional American tendency to 'moralism' or 'exceptionalism'. On the economic plane they are believed to be seeking a progressive 'absorption' of more and more states into a market-oriented international economic system. Relations with the Soviet Union are played down, except for certain subjects (the balance of terror, etc) where Russian cooperation cannot be dispensed with. On the other hand relations with their cooperating partners, including Western Europe, are becoming



complicated. Structural antagonisms such as increasing economic competition (with an ever more uniform range of products), different interests in the relations with the East, etc, have a disintegrating effect. The principal instrument for solving difficulties like these happens to lie in the West European and Japanese dependence on the USA for their security policy.

In addition the United States are felt to have succeeded in dealing with these and other problems in a fairly acceptable manner. Even though the tri-lateral policy has by no means been successful throughout, it is found to be the option, relatively speaking, which offers some promise for the future. The alternative of 'neo-isolationism' can certainly be considered as politically possible, but it could probably be pursued only over a shorter term. International dependence nowadays is so strong that any such option appears unrealistic in the long term. A policy of détente as understood during the early 1970s is likewise difficult from the point of view of the United States, as is partly shown by the (American) criticism that policy was already oriented trilaterally before the advent of the Carter administration. One of the conclusions drawn in the study therefore is that the trilateral option with certain modifications, including an upgrading of the military component, will continue to dominate American foreign policy. Meanwhile worldwide developments are so dynamic and the existing pattern of antagonism and cooperation is so complex that within a few years the future may well 'produce some new cards from its sleeve', which will lead to a restructuring of international coalitions and policies.

This study forms part of the 'Western Project'.

(107) FOA report C 10147-M3  
Power politics and the oil distribution crisis of the 1980s  
Gösta Tompuri November 1979

The starting-point for this study is a probable international oil shortage of about 500M tons by 1985, which is entirely independent of the readiness of the oil-exporting countries to produce oil. The distribution of this shortage among countries and groups of countries is seen as an international conflict of resources, and the principal object of the study is to examine the effects of this conflict on the East-West conflict in terms of security policies and to demonstrate some conceivable new patterns of alliances in the world. The most important conclusion of the study is that the antagonism between the dependence of Western Europe - and Japan - on the USA in their security policy and their dependence on the Third World for their resource policy may lead to a collapse for North Atlantic cooperation. Very much the same processes are clearly discernible in the socialist planned economies in the East.

This study forms part of the 'Catalyst Project'.

- (108) Report SP 1979:3  
 Research and training in policy analysis - impressions of a visit to  
 the USA  
 B. Schwarz

The report opens by observing that interdisciplinary research and target-oriented research often involve special problems in the search for suitable forms of organisation, funding and the recruitment and training of scientists. It discusses these problems for the field of policy analysis/systems analysis, partly in order to obtain information for discussion of the possibilities of associating the training of scientists with the research programme for 'Systems analysis and Planning' (EFI/FOA 1), the objects of which are dealt with in Chapter 2. Chapters 3 and 4 contain a brief review of the development of policy analysis in the USA and its related points of contact with the Swedish debate on research policy. Chapter 5 considers some conceptual problems and those affecting the organisation of research in the context of interdisciplinary and multi-scientific activities.

Chapter 6 reports on the arrangements for training and research in policy analysis in the USA, as observed from visits to a number of universities and institutes. There exist a number of doctoral research programmes in the USA of mutually very dissimilar types. Some are purely concerned with the social sciences, while others combine the social and the natural sciences. The report discusses the various ways in which the special problems arising in the interdisciplinary field are dealt with in the USA. Some possibilities and difficulties on introducing doctoral research programmes in policy analysis into Sweden are discussed in Chapter 8.

Research programme on systems analysis and planning (EFI/FOA 1) 1979:3.

M4 Systems and program planning

- (109) FOA report B 10032-M4  
 Supremacy at sea  
 Walter Wicklund

The task of naval forces is to maintain, assert or deny supremacy at sea. This supremacy is a precondition for securing one's own and preventing the enemy's use of the sea as a transport route. Where it is not possible to assert absolute supremacy at sea it is necessary to aim for local or temporary supremacy in order to be able rapidly and effectively to deploy one's naval forces against the enemy or to transport other forces to his territory.

These are classical principles, though still valid today. In addition technical developments have imposed further demands on naval forces: as concealed

launching sites for nuclear weapons and to defend one's own marine installations, eg drilling rigs and other equipment for extracting raw materials from the seabed.

This report also deals with the composition and tasks of naval forces and with the importance of securing seaborne transport during any future European war.

Offprint from Försvar i Nutid (1979), 3, pp 1-30;

FOA Reprints 1979/80:1.

M7 Follow-up and monitoring of scientific research outside FOA

(110) FOA report B 40097-M7

Bibliography on the evaluation of numerical software (in English)  
Bo Einarsson June 1979

This bibliography on the evaluation of numerical software was written at the instance of the IFIP working party on numerical software (IFIP WG 2.5) and is divided into nine different sections. Each section contains references in alphabetical order of first authors.

The object of the bibliography is for use in producing and evaluating good software for numerical mathematics.

Offprint from Journal of Computational and Applied Mathematics (1979), 5, pp 145-159; FOA Reprints 1979/80:7.

N MILITARY ENGINEERING RESEARCH

(111) FortF/F report No.119:6

Effects of mishaps in underground munition storages (in English)  
Göran Svedbjörk June 1979

The report deals with various methods of determining the effect in rock when exposed to high gas pressures in blasted-out cavities. The problem has practical value mainly as regards the situation which may arise owing to an accidental explosion of ammunition supplies in underground store.

The introduction covers the solution by the theory of elasticity of the problem of static pressure in a cylindrical cavity. The stresses which occur are found to be of the same order of magnitude as the applied gas pressure when the distance from the cylinder surface to the free surface is equal to the radius of the cylinder. This means that a static treatment presupposes a rock of 10-20 MPa rupture strength under normal conditions of storage in an underground space. This condition is not satisfied in actual rock since local zones of weakness can radically reduce the conditions for the transmission of *tensile* forces.

A dynamic analysis is provided in order to indicate stability, taking into account the shattering processes which occur in rock. A comparison is drawn between the relation which describes the amount of charge required for conventional blasting and the values which apply to stored ammunition. The difference in explosive force for a filled and a non-filled borehole is reported by introducing a coupling factor. This analysis shows for example that  $6.3 \text{ kg/m}^3$  storage density in a chamber area of  $80 \text{ m}^2$  can give the same explosive effect as  $1250 \text{ kg/m}^3$  in a normal borehole.

A later part of the report deals with a physical model intended to illustrate the effect of different parameters, chiefly on movements in the rock overburden. The study shows that it ought to be possible to design the system of galleries so as to permit an expansion of gases (pressure relief). The pressure relief can then be balanced against the mass of the overburden so as to obtain a reasonable amount of upward movement in the cover. The model gives the paradoxical result that hard rock in some cases may offer a smaller quantity of storage than soft rock, which is partly due to the ability of the rock to deform and hence to absorb energy.

There follows a comparison between the storage quantities permitted in NATO, Switzerland and Sweden. It shows that NATO requires considerably more rock cover than Sweden, which is due to the great difference in acceptable damage. In NATO the standard is based on a damage pattern which includes a certain degree of shaking, while the Swedish standard permits shattering and a certain amount of landslip.

Finally reference is made to a few accidents to ammunition storage, with an account of some particular effects on the rock cover.

#### EMERGENCY COUNCIL FOR PSYCHOLOGICAL DEFENCE

(112) BN Report No.93  
The measurement of opinion  
Anders Wikman (SCB)

February 1979

This report deals with certain problems in the measurement of opinions. The author proceeds from the observation that subjects of interviews are more or less definite in their replies and in consequence they may be deficient in rigour and consistency. He illustrates this by means of a questionnaire and suggests certain methods for reducing these deficiencies in precision.

- (113) BN report No.94  
International broadcasting as an instrument of propaganda  
Rutger Lindahl (University of Göteborg) April 1979

This report, which is a lengthy summary of Lindahl's doctoral thesis, deals with some of the radio broadcasts beamed on Sweden from a fairly large number of foreign stations. The information used for this investigation is material from the PROPAN Project, which was conducted by the Emergency Council in conjunction with the National Scientific Institute at the University of Göteborg.

- (114) BN report No.95  
The wind which passed over  
Harald Swedner (University of Lund) May 1979

During the second half of the 1960s what was called the Leftist Wind swept over the young people, particularly in the Western world. This study attempts to measure the effect of this political influence on opinion on two generations of youth, an older and a younger generation. The author investigates the attitudes of different groups of young people to their own society, to certain other countries and to our Defence system.

- (115) BN report No.96  
Youth and security policy  
Kurt Törnqvist October 1979

An investigation of opinion among young people aged 18-24 as to their attitude to and knowledge of security policy and their attitudes to certain matters of defence. As regards the latter, comparisons are drawn with previous investigations of young people in 1971 and 1975.

- (116) BN report No.97  
Opinion 79  
Kurt Törnqvist December 1979

A countrywide investigation of opinion on the public's attitude to society, parties and politicians, mass media, international relations and defence. The investigation also covers certain questions as to security policy and people's attitudes to future emergencies.

- (117) BN communication No.79  
Credibility of news in the press and on TV  
Raymond S.H. Lee (Journalism Quarterly) January 1979  
Translated by Kurt Törnqvist and Ingemar Staaf

In order to measure different dimensions in the credibility scale Lee has developed bipolar scales for a number of properties which, according to various sources, can be assumed to be significant for people's opinion of the credibility of news on TV and in the press.

- (118) BN communication No.80  
Public opinion and security policy - Experience in West Germany  
Kurt Törnqvist and Ingemar Staaf March 1979

An abstract of a countrywide West German opinion poll to illustrate the relation between public opinion and security policy.

- (119) BN communication No.81  
The overloaded ether: the battle of the frequencies  
Paul Lendvai (Deutsches Allgemeines Sonntagsblatt) August 1979

A translation of a West German article on Western broadcasts to Eastern Europe and the USSR. The article attempts to discuss the part played by these broadcasts in the communication of news and their effect on opinion in the receiving areas, together with the problems connected with these broadcasts.

- (120) BN communication No.82  
Psychological warfare between China and Taiwan  
Irving E. Fang (Gazette) September 1979  
Translated by Kurt Törnqvist and Ingemar Staaf

An account of the psychological warfare between China and Taiwan. The propaganda is transmitted by radio, balloons, artillery shells, rafts and loud-speakers. It is counteracted by jamming, opposing programmes, bullets and retaliation.

- (121) BN communication No.83  
The press on the snowstorm  
Kurt Törnqvist and Ingemar Staff November 1979

An examination of the dissemination of news by the press on the snowstorm in Skåne in the winter of 1978/79. The object is both to describe how the press reported on events during the snowstorm and how the press commented on information supplied by the mass media, especially local radio, to the public and the rescue services, and also how the press evaluated the public officials involved and their information during the most critical phase of the emergency.

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